PHYS 1210 Worksheet: Pendulums

1. The small-angle approximation is $\sin\theta \approx \theta$ in radians. How small must the angle θ be for this approximation to be realistic?

θ	$\sin\theta$	$\theta - \sin\theta$	$(\theta - \sin\theta)/\sin\theta$
$1/180\ \pi = 1°$			
$2/180\ \pi = 2°$			
$5/180\ \pi = 5°$			
$10/180\ \pi = 10°$			
$20/180\ \pi = 20°$			
$45/180\ \pi = 45°$			
			1%
			5%
			10%

2. Would a "physical" pendulum, in which the bob is an extended shape with its own center-of-mass moment of inertia $I_{cm} > 0$, have a longer or shorter period than a simple pendulum of the same mass and length?

3. Find the length of a simple pendulum with a period of oscillation of 2.0 s.